CLAIMS

What is claimed is:

1)   A method for processing packets through a plurality of protocol layers

5   comprising:

        accessing a packet associated with a connection; and

        processing said packet through said plurality of protocol layers using a

single thread wherein connection state information used by said plurality of

protocol layers is preserved by mutual exclusion of other threads processing

10   packets for said connection through said plurality of protocol layers.

2)   The method as described in Claim 1 wherein said single thread is

uninterrupted while processing said packet through said plurality of protocol

layers.

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3)   The method as described in Claim 1 further comprising assigning said

packet to a processing queue wherein said processing queue provides single

threaded processing of said packet through said plurality of protocol layers.

20   4)   The method as described in Claim 3 wherein said processing queue

provides single threaded processing of said packet through said plurality of

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protocol layers by assigning only one packet to be processed by said plurality of protocol layers at a time.

5) The method as described in Claim 4 wherein said packet is assigned to
5   said processing queue based on address information of said connection.

6) The method as described in Claim 1 further comprising generating a connection data structure specific to said connection based on address information of said connection.

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7) The method as described in Claim 6 wherein said address information comprises a local IP address and a remote IP address.

8) The method as described in Claim 7 wherein said address information
15   further comprises a remote port address and a local port address.

9) The method as described in Claim 1 further comprising assigning said connection to a single processor of a multi-processor computer system wherein packets associated with said connection are directed to said single processor for
20   processing by said single thread.

10) A method for processing data packets comprising:

accessing a data packet associated with a connection; and

assigning said connection for processing to a single processor of a

multiprocessor server system wherein said single processor services all data

packets associated with said connection.

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11)   The method as described in Claim 10 further comprising processing said

data packet through said plurality of protocol layers using a single thread wherein

connection state information used by said plurality of protocol layers is preserved

by mutual exclusion from other threads processing packets for said connection

10   through said plurality of protocol layers.

12)   The method as described in Claim 11 wherein said single thread is

uninterrupted while processing said data packet through said plurality of protocol

layers.

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13)   The method as described in Claim 11 further comprising assigning said

data packet to a processing queue associated with said single processor wherein

said processing queue provides single threaded processing of said data packet

through said plurality of protocol layers.

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14)   The method as described in Claim 13 wherein said processing queue is

an squeue. .

15) The method as described in Claim 13 wherein said processing queue provides single threaded processing of said packet through said plurality of protocol layers by assigning only one packet to be processed by said plurality of

5 protocol layers at a time.

16) The method as described in Claim 10 further comprising generating a connection structure entry specific to said connection based on address information of said connection.

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17) The method as described in Claim 16 wherein said address information comprises a local IP address and a remote IP address.

18) The method as described in Claim 17 wherein said address information

15 further comprises a remote port address and a local port address.

19) The method as described in Claim 16 wherein subsequent data packets of said connection, are assigned to said single processor based on said connection structure.

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20) A method for processing packets comprising:

accessing a packet associated with a connection; and

assigning said packet to a processing queue wherein said processing queue provides uninterrupted single threaded processing of said data packet through a plurality of protocol layers.

5 21) The method as described in Claim 20 wherein said processing queue provides mutual exclusion of same-connection packet processing through said plurality of protocol layers.

22) The method as described in Claim 20 wherein said processing queue is
10 associated with a single processor of a multiprocessor server system and wherein all packets associated with said connection are processed by said single processor.

23) The method as described in Claim 20 further comprising generating a
15 connection structure associated with said connection based on address information of said connection.

24) The method as described in Claim 23 wherein said address information comprises a local IP address and a remote IP address.

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25) The method as described in Claim 24 wherein said address information further comprises a remote port address and a local port address.

26)   The method as described in Claim 25 wherein said connection structure is
used to assign subsequent packets associated with said connection to said
processing queue.

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27)   The method as described in Claim 20 wherein said plurality of protocol
layers includes a TCP protocol layer.

28)   The method as described in Claim 20 wherein said plurality of protocol
10   layers includes an IP protocol layer.

29)   A method of processing packets comprising:

    processing packets of a same connection through a plurality of protocol
layers of a communication system, wherein state information of any given packet
15   is preserved because said packets are individually mutually excluded from said
protocol layers.

30)   A method as described in Claim 29 further comprising assigning a packet
of said same connection to a queue, said queue associated with said same
20   connection and further comprising said queue assigning packets of said same
connection to said plurality of protocol layers only one packet at a time.

31)   A method as described in Claim 30 further comprising generating a
connection data structure unique to said same connection and identifying
packets of said same connection using said connection data structure.

5   32)   A method as described in Claim 31 wherein said packets are identified as
belonging to said same connection via address information stored in said
packets.

33)   A method as described in Claim 31 wherein said queue is associated with
10   said connection data structure.

34)   A method as described in Claim 31 wherein said packets of said same
connection are processed through said plurality of protocol layers using a same
processor of a multi-processor computer system.

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35)   A method as described in Claim 34 wherein said packets of said same
connection are processed using a single thread.

36)   A multiprocessor server system comprising:
20   a plurality of processors for processing packets through a plurality of
protocol layers;

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a plurality of queues, each queue associated with a respective processor

of said plurality of processors; and

a memory resident connection data structure for assigning packets of a

same connection to a same queue of said plurality of queues for processing said

5   packets of said same connection by a same processor of said plurality of

processors.

37)   A multiprocessor server system as described in Claim 36 wherein said

connections are TCP connections.

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38)   A multiprocessor server system as described in Claim 37 wherein said

plurality of protocol layers comprise: IP; TCP; and socket layers.

39)   A multiprocessor server system as described in Claim 36 wherein a

15   processor of said plurality of processors processes a packet of its queue without

interruption through said plurality of protocol layers except for scheduling another

packet on its queue.

40)   A multiprocessor server system as described in Claim 37 wherein a

20   processor of said plurality of processors processes a packet of its queue without

interruption through said plurality of protocol layers except for scheduling another

packet on its queue.

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41)   A multiprocessor server system as described in Claim 37 wherein said

connection data structure is established for a new connection upon receiving a

new connection request and wherein said connection data structure comprises

5   an identifier of a queue to which all packets of said new connection are to be

assigned.

42)   A multiprocessor server system as described in Claim 36 further

comprising a plurality of cache memories, each cache associated with a

10   respective processor of said plurality of processors.

43)   A multiprocessor server system as described in Claim 36 wherein state

information of any given packet of a same connection is preserved because said

packets of said same connection are individually mutually excluded from said

15   protocol layers.

44)   A computer system comprising a processor coupled to a bus and a

memory coupled to said bus and comprising instructions that when executed

implement a method for processing data packets comprising:

20   accessing a packet associated with a connection; and

processing said packet through said plurality of protocol layers using a

single thread wherein connection state information used by said plurality of

protocol layers is preserved by mutual exclusion of other threads processing

packets for said connection through said plurality of protocol layers.

45)   The computer system as described in Claim 44 wherein said single thread

5   is uninterrupted while processing said packet through said plurality of protocol

layers.

46)   The computer system as described in Claim 44 wherein said packet are

assigned to a processing queue wherein said processing queue provides single

10   threaded processing of said packet through said plurality of protocol layers.

47)   The computer system as described in Claim 46 wherein said processing

queue provides single threaded processing of said packet through said plurality

of protocol layers by assigning only one packet to be processed by said plurality

15   of protocol layers at a time.

48)   The computer system as described in Claim 47 wherein said packet is

assigned to said processing queue based on address information of said

connection.

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49)   The computer system as described in Claim 44 wherein a connection data structure is generated specific to said connection based on address information of said connection.

5 50)   The computer system as described in Claim 49 wherein said address information comprises a local IP address and a remote IP address.

51)   The computer system as described in Claim 49 wherein said address information further comprises a remote port address and a local port address.

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52)   The computer system as described in Claim 44 wherein said connection is assigned to a single processor of a multi-processor computer system wherein packets associated with said connection are directed to said single processor for processing by said single thread.

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53)   A computer system comprising a processor coupled to a bus and a memory coupled to said bus and comprising instructions that when executed implement a method for processing data packets comprising:

accessing a packet associated with a connection; and

20   assigning said packet to a processing queue wherein said processing queue provides uninterrupted single threaded processing of said data packet through a plurality of protocol layers.

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54) The computer system as described in Claim 53 wherein said processing queue provides mutual exclusion of same-connection packet processing through said plurality of protocol layers.

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55) The computer system as described in Claim 53 wherein said processing queue is associated with a single processor of a multiprocessor server system and wherein all packets associated with said connection are processed by said single processor.

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56) The computer system as described in Claim 53 wherein a connection structure associated with said connection is generated based on address information of said connection.

15 57) The computer system as described in Claim 56 wherein said address information comprises a local IP address and a remote IP address.

58) The computer system as described in Claim 57 wherein said address information further comprises a remote port address and a local port address.

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59)   The computer system as described in Claim 58 wherein said connection

structure is used to assign subsequent packets associated with said connection

to said processing queue.

5   60)   The computer system as described in Claim 53 wherein said plurality of

protocol layers includes a TCP protocol layer.

61)   The computer system as described in Claim 53 wherein said plurality of

protocol layers includes an IP protocol layer.

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